

Thrills without spills

AS FARMERS INCREASE SPRAYING TO CONTROL WEEDS AND IMPROVE CROP YIELD, THEY'RE BOUND TO BE DELIGHTED BY PUMP TECHNOLOGIES THAT MAXIMISE CHEMICAL USE AND SEAL LIFE YET PREVENT SPILLAGES

Throughout the agricultural community, the use of chemicals to restrict unwanted weeds and insects and to promote the growth of plentiful, wholesome crops is rising, as is the size and capacity of the spray equipment used to dispense them. With this size increase, the chance that the onboard chemical supply tank will run dry at the farthest distance from the main supply tank increases considerably. Although all operators know that centrifugal pumps should never be operated without a fluid present inside, they are keen to use every last drop of the expensive chemicals on their crops. Yet the operator's attention is split between monitoring the boom system, the flow-rate controller and the GPS guidance to optimise coverage.

When a typical centrifugal pump runs dry, the rotating and stationary faces of the mechanical shaft seal lose the fluid film that normally separates the faces. The increased friction causes an increase in heat up to the melting point of the surrounding elastomer seal components, causing seal failure and the pumped fluid leaks onto the ground.

For many years, chemical and petroleum processing plant pumps have used systems with an intermediate chamber between the pressurised portion of the pump and atmosphere, and a double mechanical seal. One seal is situated on each side of the chamber, providing a buffer zone and trapping leaking chemicals and preventing their escape. The chamber is filled with a neutralising fluid that does not react with the pumped fluid and provides a continuous cooling and lubricating film between the rotating and stationary seal faces.

Solution to seal failure

Ace Pump uses this same double mechanical seal in an air-pressurised buffer chamber on its Max Series Oasis Wet Seal Technology pumps such as the FMCWS-650F-HYD (go to www.OasisWetSeal.com for more details). With this pump and the larger FMC-750F-



FIGURE 1 (LEFT): FMCWS-650F-HYD pump with Oasis WetSeal

FIGURE 2 (BELOW): Typical trailed field sprayer

FIGURE 3 (BOTTOM): Performance comparison for typical centrifugal and Barske-style pumps



HYD pump, the pressurised buffer fluid is used as a source for the lubrication and cooling of the mechanical seals, keeping the seal faces from heating in excess of 250°F (121°C) should the supply tank run dry.

The increase in the volatility of farming chemicals, the worldwide environmental awareness and the new stricter regulations against chemical spills, particularly in the EU, make the double seal and buffer chamber almost a necessity on modern crop-spraying equipment. Pressurising the buffer chamber maintains the fluid film on the seal faces, isolating them from abrasive material often found in modern fertilisers.

This Ace centrifugal pump uses a straight blade, open-faced Barske-style impeller driven by a high-efficiency, pressure-balanced gear motor supplied by Marzocchi. This combination provides higher spraying pressures at a lower rpm and a very flat pressure-to-flow curve for easier spray-rate regulation through modern electronic spray controllers. Figure 3 shows the performance difference between the Barske and a typical centrifugal pump.

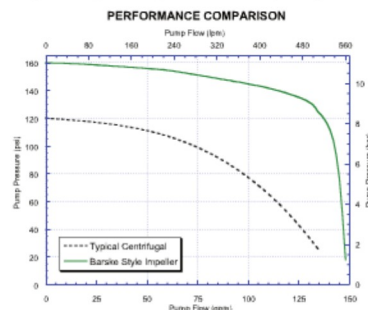
This high-flow capability at high-pressure delivery improves crop canopy penetration and spray efficiency, in conjunction with a nozzle system designed to produce low drift of the sprayed fluid from the desired

coverage area. Additionally, the open face straight blade-style impeller enables a free and unrestricted flow of materials; even those with a high percentage of suspended solids.

Meeting farmers' needs

As the world's farms increase in size, more farms share spraying machinery or employ contractors, so the equipment needs to offer improved reliability and longer service life. A system that improves seal life, combined with a pump that uses more-efficient electronic spray controls to deliver higher flows over a wider high-pressure range, should meet the needs of farmers everywhere. **ivT**

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